Results from RICOWI Hail Investigation Program (HIP) May 24, 2011 Storm

"War on Hail" Symposium

Irving, TX

Who is RICOWI?

- Roofing Industry Committee on Weather Issues
- Non-profit comprised on roofing industry trade groups, consultants, researchers,
- 12 Sponsor Members and ~60 affiliate members
- HIP (hail) and WIP (hurricane) investigation programs

Hail Investigation Program (HIP) Mission statement

- To investigate the field performance of roofing assemblies after major hail storm events.
- To factually describe roof assembly performance and modes of damage.
- To formally report the results for substantiated hail events.

Target Area-DFW Metroplex

- Dallas/Fort Worth Area-home of the greatest concentration of impact resistant roofing products.
- Largest metro area in the IRC severe hail risk zone.
- DFW area was targeted for next HIP starting in 2009. 2009 & 2010 passed without significant hail event.

May 24, 2011 Event

- Multiple supercell thunderstorms pass through Dallas-Fort Worth area.
- Reports of up to 4” hail in both Dallas and Tarrant Counties.
- Inspections made June 13-17, 2011.
- 7 Inspection teams balanced between manufacturers, consultants, insurance, and researchers.
- 91 steep slope and 19 low slope roofs

Irving TX Hail

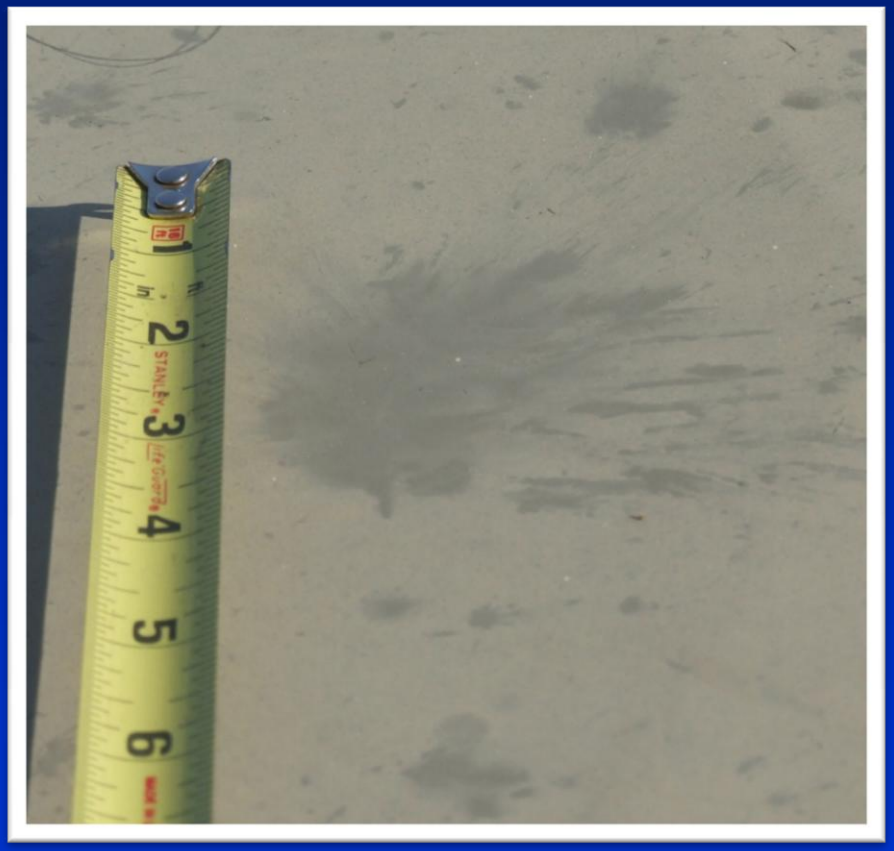
Damage Ratings

- 0 - No Apparent Damage
- 1 - Surface Impact Marks Without Fractures/Punctures
- 2 - Minimal Damage (Quantity/Severity)
- 3 - Moderate Amount of Fractures/Punctures/Spalling
- 4 - Moderate/Severe Denting of Metal
- 5 - Severe Damage Resulting in Potential Leakage

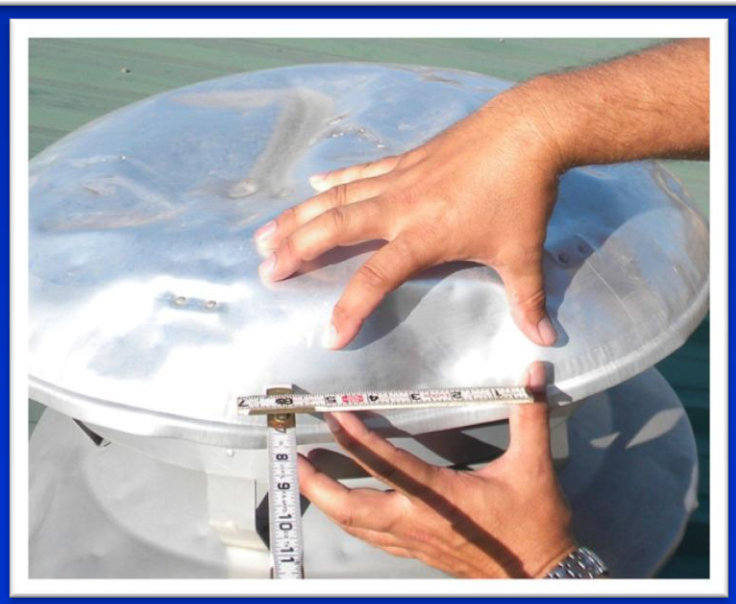
Steep Slope Roofs

- Asphalt Shingles - 63
- Metal (all types) - 16
- Cedar Shingles/Shakes - 5
- Tile (Concrete & Clay) - 5
- Synthetic - 2

Determining Hail Size-Spatter



Determining Hail Size-Dents



Standard Asphalt Shingles

Site 2.06: Max Hail Size 2.25” (Puncture)

Standard Asphalt Shingles

Often greater damage to ridge/hip due to lack of support

IR Asphalt Shingles

Site 5.07: Max Hail Size 2.5”
(Fracture/Rupture)

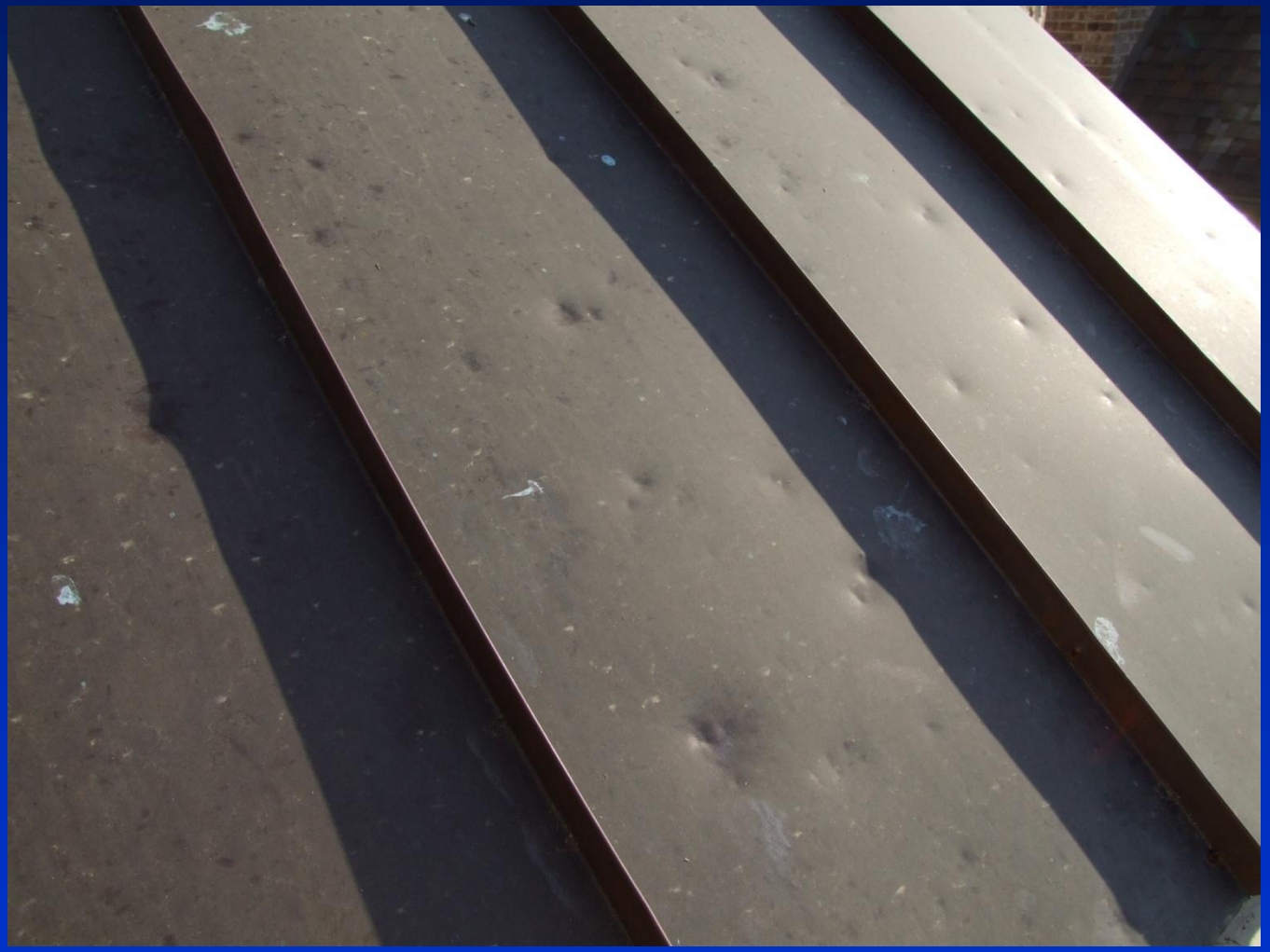
IR Asphalt Shingles

Site 5.12: Max Hail Size 2.5”
(Fractures/Punctures)

IR Asphalt Shingles

Site 2.13: Max Hail Size 1.5” (No Damage)

Metal-Copper Std Seam



Site 6.15: Max Hail Size 2.5” (Dents)

Metal-Painted Shingle Panel

Site 5.15: Max Hail Size 2.5” (Dents)

Metal: IR Stone-coated Panels

Site 2.14: Max Hail Size 1.5” (No Dents)

Metal: IR Stone-coated Panels

Site 2.16: Max Hail Size 2.5” (No Hail Dents)

Metal: IR Stone-coated Panels

Site 2.16: Scratches and granule removal from mechanical contact

Cedar Shingles

Site 7.02: Max Hail Size 1.0”
Surface marks without splits only

Cedar Shakes

Site 5.17: Max Hail Size 2.25”
Splits and punctures

Concrete Tile

Site 5.16: Max Hail Size 2.0”

Clay Tile

Site 3.12b: Max Hail Size 2.5”

Synthetic Slates

Site 3.06: Max Hail Size 1.0”

Synthetic Slates

Site 6.07: Max Hail Size 2.0”

Synthetic Slates

Site 6.07: No Fractures

Steep Slope Results

- Hail-caused damage, if it occurred, was apparent to the trained eye.
- Hail impact effects were distinguishable from normal weathering effects. Impact “spatter marks” were visible on many surfaces, and fresh/clean fractures found in materials such as wood and tile.

Steep Slope Results

- Max hail size <1”: no damage except when very deteriorated and/or unsupported
- Max hail size 1”-2”: damage varied from none to severe (levels 0-5) depending on material type and condition
- Max hail size 2”+: normally moderate to severe damage (levels 3-5). Exceptions (levels 0-2) IR asphalt shingles, steep-pitched standard asphalt shingles, concrete tile, and IR stone-coated metal panels.

Results-Newer Asphalt Shingles Perform Better

- Less than 10% of the roofs 0-9 years old had significant (level 3-5) damage
- 32% of roofs 0-9 years old had no damage
- All roofs over 9 years old had some damage
- 60% of roofs over 9 years old had significant (level 3-5) damage

Results-IR vs Standard Asphalt Shingles

- Class 3 or 4 IR rated asphalt shingle products outperformed standard asphalt shingles
- Standard Asphalt Shingles: moderate to severe damage generally with 1.25”+ hail

  Avg. Damage Rating 2.4
- IR Asphalt Shingles: only one instance of moderate or severe with <2” hail

  Avg. Damage Rating 1.3

Impact Resistant Asphalt Shingles

- 12 roofs reported to have IR (Impact Resistant) shingles
- 6 impact resistant roofs with no physical damage
- One impact resistant roof with severe damage due to 2.5” hail
- No moderate or severe damage with hail smaller than 1.75”

Steep Slope Results

Metal Roofing

- Metallic and painted coatings were not found to be chipped or fractured at hail-caused dents
- No denting or minimal denting with hailstones <1.5”
- No denting to severe denting with hailstones 1.5”-2.5”
- A few instances of distorted seams or panel overlaps with 2.5”+ hailstones

Correlation to Impact Testing Procedures

- UL 2218 and FM 4473 test unweathered products with ice or steel balls ranging from 1.25” (class 1) to 2.0” (class 4) to simulate hail resistance.
- RICOWI data suggests this is an appropriate size range, and the vast majority of weathered IR products performed at or above ratings
- Conclusion: use of class 3 or 4 IR products will reduce severity of damage or eliminate damage with hail sizes of <2” diameter

Low Slope Roofs

- Built-up Roofing - 8
- Modified Bitumen – 8
- Single-Ply Thermoplastic - 3

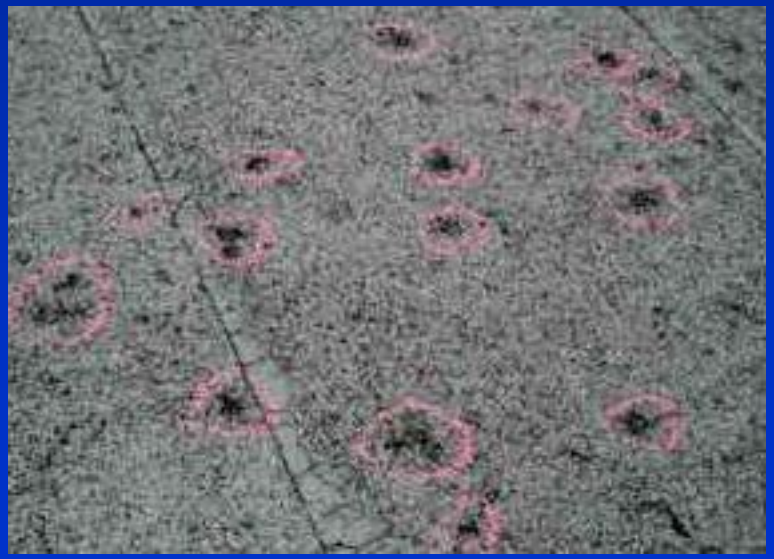
Built-up Roofing

- Average damage rating 2.0
- Generally performed well on ballasted systems with hail sizes up to 2.5 inches in diameter
- Only BUR with severe damage struck with 3” hail

Site 4.08: Max Hail size 2.25”

Modified Bitumen Membrane

- Average damage rating of 3.75
- Moderate or severe damage when hail size 2” diameter or larger.



Site 4.06, Max Hail Size 2.5”

Single-Ply Thermoplastic

- Not enough data to make meaningful conclusions.

Site 3.12: Max Hail Size 2.5”

CONTACTS

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